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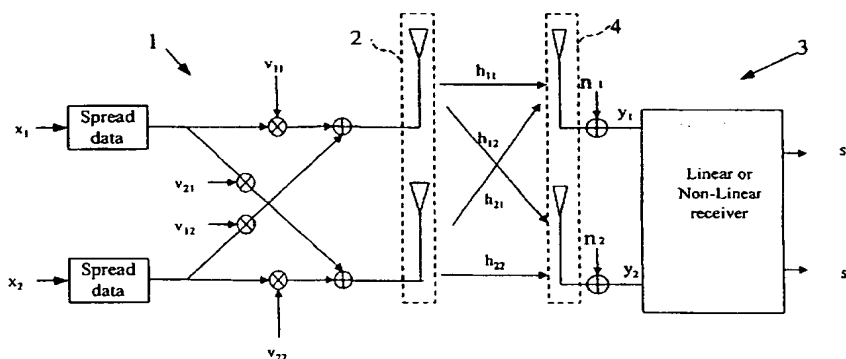
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(54) Title: WIRELESS COMMUNICATION USING MULTI-TRANSMIT MULTI-RECEIVE ANTENNA ARRAYS



(57) **Abstract:** A method of closed-loop multi-stream wireless communication between a transmitter (1) comprising a transmit antenna array of N transmit antenna elements and a receiver (3) comprising a receive antenna array (4) of M receive antenna elements, wherein a plurality of distinct data streams (x_1 x_2) are transmitted from the transmit antenna array to the receive antenna array and the data streams are weighted by respective complex weighting matrices before being applied to the transmit antenna array. The distinct data streams are separated and estimated at the receiver. The distinct data streams (x_1 x_G) are applied to respective sub-groups (6,7) of the transmit antenna elements at least one of which comprises a plurality of the transmit antenna elements each of the sub-groups comprising at least N_d transmit antenna elements, where M is greater than or equal to (N/N_d) . The complex weighting matrices (v_1 to v_n) are functions of the respective transmission channels (h_{ij}) of the data streams (x_1 to x_G) including the respective sub-groups of transmit antenna elements. N_d is preferably greater than or equal to two. Each of the complex weighting matrices is calculated to be substantially equal to the eigenvector corresponding to the largest eigenvalue of the matrix $H H^H$, where H is the matrix of the equivalent channel including the respective sub-groups of transmit antenna elements (6,7) seen by the corresponding data stream $H H^H$ is the Hermitian transform of the matrix H. The number of the transmit antenna elements in each of the sub-groups is preferably re-configurable during operation as a function of channel conditions.

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